Notebook, N-95-09-11

This notebook covers the periods September-October 1895 and December 1897. It was used primarily by Jonas W. Aylsworth, probably at New Jersey and Pennsylvania Concentrating Works in Ogden, N.J. Most of the book contains notes regarding the bricking of iron ore concentrate. Included is a 10-page entry by Edison relating to the bricking process. At the end of the book there are logs of additional bricking tests and rough records regarding running and stoppage times at the Ogden works. The front cover is labeled "Bricker Experiments." The inside front cover is inscribed "J W Aylsworth." The pages are unnumbered, and the book has been used in both directions. Approximately 90 pages have been used.

About 40 pages of rough records regarding running and stoppage times have not been filmed.

The Briquette plant was started with mix consisting of Rosin 2 parts Lima Oil 1 pt. 3.3 lbs to the ton of ore was used.

Very few whole briquettes come through breakage = about 90%.

Apparatus was put in to handle the briquette more gently soon then the breakage was not materially decreased.

Experiments were tried to see if much was OK. Lime much made up with some proportion appeared to be identical with much from the bottles. Then some was mixed with the ore 33 lbs. to ~~ton~~ this appeared some or that mixed in briquette mixers –

Sept 11 / 95

Experiments were made with a stretcher mach.

#1

Rosin 100
Oil 35

Mixed with ore in proportions of Ore 2240 Mach. 33
Made a much stronger + better briquett.

#2

Rosin 100
Oil. 25
Mixed in proportions of ore 2240 Mach 33
Was difficult to mix but when the ore was warmed to about 100°F. it mixed all right.
The briquetts were very strong could be handled & lift without breaking

Loaves of #1 2
were baked & came out
very hard though while
hot & before the baking has
been completed they could
not be picked up.
It was concluded that
the pressure in bricken machine
would improve them in this
respect.

3

#2 much mixed in proportion
of 2240 ou to 25 much.
Quite as hard as #2

4

#2 much mixed in proportion
of 2240 ou to 20 much.
very hard much dagger &
better stuff to feed down shutes.

The briches were started with # 2 mesh 33 lb to ton,

mixed all right but were to sticky & did not feed to the briches all right.

Then some # 4 was tried this ones did not feed well & appeared to be too dry but the percent of good briquette were better than previous trials.

A average test of mixed ore taken at 8 different intervals of time was 14 lbs to ton.

This was tested by dissolving coal tar mixed with benzene & then alcohol & weighing the ore when dry & allowing for the moisture in ore previously determined.

Experiments on a quick way of testing the oil to see that much is O.K.

A weak solution of NaHO is made up of such strength that 1 cc neutralizes (i.e. 17 grammes of 2 cc to 100 mmch. (or the reverse in litters.) The mmch is dissolved in 50 cc. of wood alcohol, of which the solution has been affected 10 drops of moderately strong solution of phenolphthalein in alcohol, are added.

100 grammes of oil are taken & mixed with 50 cc of alcohol & heated, can bring latter to shake well frequently.

The wood alcohol was tested & 50 cc were found to take $\frac{1}{10}$ cc of N/10 sol before it became neutral. Hence $\frac{1}{10}$ cc must be deducted from the results in practice.

The std soda solution is added from a burette until a red color appears & remains after well shaking.
The mixture must be stirred while the std sol is being added.

The crude oil contains a little acid that will not much and it will make no difference in results as the solution is always discharged with mucks of not with rosin.
10 cc std sol = acid in the Oil.

1 cc of the std sol = .158 gm rosin.

Some fresh muck was made up of exact proportions 100 rosin to 25 Oil. This muck when tested gave —

1 cc std sol = .1923 of 100 to 25 Muck
This is correct the muck in bottles contains less oil than 25 to the 100
The amount of rosin in the std sample of muck was determined exactly by the std sol of Soda.

A test of old mesh tinnf
was in bottle when briket plant
first started up gave Resin 100 to Oil 43.8

Heating briquette in iron
tube mesh mesh is seen off

Wt of ½ brick. 148.75 (before heating)

" " ½ " 146.6 (after ")

mesh in brick, = 55 lb. to ton.

The briquette after heating to
500° for about 1 hr. was [illegible]
hard.

Wt of mesh in brick = 2.47

Loss of weight in heating = 2.15

Of this loss, .44 can be considered as
moisture contained in the ore

This leaves a loss of 1.71 mesh
or .76 gm of mesh remained
in 148 gm ore.

94.85 : 2 = 2265 : 25
25
47425
18970
2371.25 : 2265
2265 1.04
106.25

Determination of Residue left in briquette after baking.

The briquette was a perfect mixture of 25 lb smack to tone on.

It was baked 40 minutes between 450°F & 470°F.

Wt of briquette. = 94.85 gm.
" " smack taken = 1.04 "
Loss of smack in baking = .55
Residue remaining = .49

A briquette was quite strong notwithstand the alcohol test from some time but ultimately softened somewhat, but did not entirely collapse.

#9. 10/3/91

[illegible]

[illegible] much [illegible] [illegible]

[illegible]

From [illegible] cotton cold at [illegible]

[illegible] 40 [illegible]

[illegible]

The moisture much 2.7 = 20 lbs per ton.

B briquette pressed in wire

[illegible] before baking 15.3

Baked in 35 minutes at 480°-660°F.

Wt of briquette after baking. 15.2.15

" " much in briquette = 1.37

Loss in wt = .85

Material remaining = 1.52

#10

Resin 100

Resinoid 50

Na_2O 2 (found)

Ferrous Sulphate 8.8 to be added after the soda has gone in.

no good.

#11

Precipitated nitrate of iron is mixed with (100 : 50) mark it dissolve.

12 10/8/95

Baking Experiment

Bar with 4x 4 to stone

#1 Baked in ▭ from Tem 510° 1½ hr.
No apparent oxidation
Brittle granules with cold water
while hot
Broke in two when tossed up 10 ft.

#2 Baked on list ▭ ~~same as~~ #1
Cardboard on top corners so that
it was crumbly
broken without nothing.
Tossed up ten ft did not break
but corner broke off when it struck.

#13

Briquette with up to tons.
Baked in circle 430 - 520° 1½ hrs.

#14

Same kinds of briquettes as #13
Baked with five acres grain all around.
Baked at 430 - 570° 1½ hrs.

15

45 lb. Muck (100 % to 25) to 1 qu.
then mixed some crude oil was added,
heated & well mixed,
Pressed but not very hard, could
be lifted.
It did not compress as much as
those without the oil,

Baked at 480°-500 1 hr.
Extremely hard & easily pressed
by a load of 15 lb, comes short —
Deduction — The oil causes
tighter, stiff, much sturdier more uniformly
over all formula, shape, moisture in formula
due to the oil ~~and left brown by evaporation of~~
~~the oil~~ #16

45 lb. (100-25 muck) to 1 qu.
Baked at 460° F 1½ hr.
Very good & hard briquette much
improvement over 12, 13 & 14 &
Good the alcohol test & was
all right throughout the whole briquette,

17 10/8/95

As to time, 100 hr. 25 minutes.

Briquette formed of first mixture (about 1 c.c. [illegible] oil) put on lift of briquette.

Coked at 400 to 500° for 1½ hr.

Briquette dropped 15 feet (tossed up) was not moved except to take a corner off.

Would say that this one was a considerable improvement over others of 12, 13 & 14.

Briquette was placed in ⊔ dish & left shape OK.

The 1 c.c. of oil may have acted in two ways, one causing the mush to flow & cement every contact point, the other by keeping other item fracture down around 450° for a longer period causing more iron resinate to be formed.

#18 10/9/95

Grain 100
Sand [illegible] from 1 lb in [illegible]) 40
French horse well stirred

Mixture made of above with 35 lbs per ton
Baked at 450° to 470° 1½ hr.
Briquette not very hard broke
in two when dropped 6 ft.
only very slightly softened by water.

#19

Mixture made with #19 mark
40 lb to ton.
Baked at 480 to 500° 1 hr.

20. 10/9/91 -

½ of a 45 lb ton (256100 mesh.)
briquette heated at 460°F 1hr
then 30 min at 500°F. (Burned too fast at a short time at first)
To see how much resin will remain or reinmate.

Wt of ½ briquette = 150.82

After baking wt = 149.15
Loss. = 1.67

% loss = 1.107

20.2 lbs to ton of ore remains.

21.

The other half of briquette used in #20 took 75 min to gelle 500°
heated at 500° for 30 min.

wt of briquette. = 149.53
147.9
1.63

% loss = 1.103

20.3 lbs. per ton remains after baking.

#21 & 20 were equally hard.

#22 12/9/41

Duplicate of #20 except temperature was run to 470° & held there 40 min: then to 520° & held there 40 min.

Wt of briquette = 148.15

" " after " = 146.98

1.17

% loss = 1.123

#23.

Duplicate of #21 except the heat was run to 520° & held 40 min.

Wt of briquette = 151.95

" " after " = 150.15

Loss. 1.80

% loss = 1.112

Experiments on Briquettes -

We have been using Muck consisting of 25 oil & 100 Rosin - Heating warm ore at the mixer so we could mix it. When the ore is 118 @ 120 we have no trouble in mixing this style of muck by the time the ore gets through the last mixer the ore is cold and can be squeezed into quite a hard ball in the hand it appears to be perfect for bricking but the bricks from the Machines were not very strong, breaking when dropped on the floor 15 @ 20 inches, Even after 24 hours they broke by dropping 2 feet, We attributed this to the fact that the springs on the Bricker machine plunger were made double length and consequently did not put enough ore into the mould to give proper pressure In fact the

pressure springs on the levers did not leave when making brix showing that bricks did not get enough pressure —

These bricks went through the new oven and were no good nearly every one broke at the delivery dump — I took one up to assay room and found that it was baked all right except 1/4" at center

Aylesworth determined the amount of muck per ton & found there was 23 lbs only. the muck feed not giving 30 as intended,

We now make a number of tests to determine the proportions (10) the proper formula for the muck the amount per ton and the effect of pressure more or less —

The first experiment is Oct 30 Room 100 used 30 lbs of this formula to the 1m

made four brick-

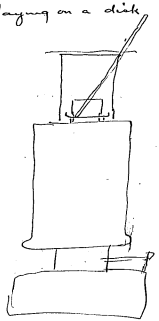
1st with light pressure in Vise.
2 with one turn more
3 " two " "

(10) The first one had the handle of vise turned so you could feel that the pressure was on & then it was given one complete turn, The 2nd brick was given 2 " turns & so on — 3 turns was the most pressure possible with jerking by one person.

The amount for each brick was weighed out to somewhat more than the regular brick being 320 grammes of ore, The resulting brick is say 1/4 to 3/8 higher than the regular size made by the machines —

These 3 brick varied in height after being pressed 1/16 inch between each other; between the 1st & 2nd it was probably a little more than 1/16 = We also made a 4th brick of the same ore which was allowed to get very cold outdoors & gave it the same pressure as No 2.

The bricks were then all baked in the Kerosene stove laying on a disk



The Thermometer also laid on the disk
The temperature were between 480 & 510
for one hour —

Results, No 1 broke when dropped on Table 3 inches above. Alcohol test showed it was thoroughly baked.

No 2 broke when raised about 2 feet.

No 3 " " " 3 feet,

Alcohol test showed they were all baked

No 4 acted just the same as No 2

One of the bricks made by the machine at the first test with new oven was baked also in kero stove, it broke in foot fall,

Same brick set inside of boiler door coundnt be picked up by hand after 50 minutes & when cool, the lefs was all out of it, This shows high heats are bad probably on account of oxidation —

2nd Experiment, formula 30 oil 100 Rosin, same as the first experiment but instead of 30 lbs per ton was used 40 lbs per ton and make 3 brick —

No 1 B one turn of vise handle
No 2 B Two " "
No 3 B Three " " the latter being
all cylinworth roof coved do —

We bake each 1 hour.

(Note = The one for one brick which we did not use but laying loose on the paper — cold had by its own weight got hard so pieces could be picked up = on squeezing in hand it made a very strong ball + appears fine for bricking although I think we shall have a little trouble with this proportion in feeding it to brickers —)
Except in very cold weather —

~~At~~ No 1 B with light pressure baked one hour, dropped 7 feet without breaking only an edge chipped off — had to ~~after~~ dropping it from 2 ft then 4 ft + then 7 ft a not breaking it I threw it up about 10 feet and it broke in 3 or 4 pieces but no fines to speak of. Alcohol test fully baked

No 2 B. - dropped it 7 ft didnt break then dropped it 10 feet didnt break only piece chipped off - Then threw it up 20 feet only broke off some more Edges had to throw it hard against the door & then it broke only in 2 pieces Alcohol test showed fully baked

No 3 B. dropped 10 ft didnt break or chip = threw up 20 feet didnt break or even chip threw it hard although it struck on stone lintel of door threw it hard against door didnt break, on second trial against door using more strength it broke in two parts with no fuses,

Took one of the pieces & threw it with great violence against door without breaking — Dont think Bricker machine could produce

Bricks with the pressure Cut
could easily produce those
as harder or harder than 2 B

3rd Experiment.

35 oil 100 Rosin —

30 lbs of mixture to the ton.

No 1 C is One turn of handle of vise
No 2 C " Two turns "
No 3 " Nearly 3 turns "

Notice that it finds its pressure quicker than either A or B experiments, which would show that it requires some power to force out through the filmes of mucl when stiff and Cold.
our Kerosene stove gave trouble & dont think the Baking on this experiment is correct Either with 1 C + 2 C = We did not watch stoves for 15 minutes & one got smoky & temp too low — The other one had also low temperature. but guess they will be Baked OK

No 1 C. dropped one foot didnt break - Broke at 2 foot,

No 2 C. Dropped 3 ft didnt break. dropped 5 ft didnt break, dropped 7 ft broke but only 1/3 broke off threw remainder up 12 feet it broke in several pieces =

No 3 C dropped 7 ft didnt break - dropped 10 ft Broken in half like this

945-

135-
6
810

500
175-

135-
5
675-

35-
7
245-
700

135-
7
945-

4th Experiment.

35 oil 100 Rosin -

Used 40 lbs to the ton,

No 1 D is one turn of vise
No 2 D is two turns of vise
No 3 D is 3 turns, as much as anybody could do by jerking

No 1 D dropped 7 ft didnt break - dropped 10 ft broke in two pieces

thus -

~~Thus~~
No 2 D dropped 10 ft didnt break - had to throw it up 20 ft & broke in 3 pieces

Test of viscosity of smoke mixtures.

Dec 8, 1897

The figure in circle or oval represents number of eighths of an inch on scale of testing machine passed in one minute by calculation based on number passed in a fourth of a minute.

The figure on right underneath is the inches on arm that weight is placed, on left underneath approximate reading.

20 oz. Brown
5 oz. oil — (51) 9" — 9 sec rising — 8½ minutes breaking — 8/9 .11
8-53 Am — 73°

20 oz Brown
8 oz oil — (41/2) 9" — 1-30 sec rising
Brown 82°
73°

20 oz Brown
8 oz oil — (?) 9" 2'20" breaking — 4 sec rising — 19/6 — 8.4
Brown 77°
73°
9-14-10

20 oz Brown
5½ oz oil — (66) 9" 3' breaking — 7 sec rising
73°
9-22-30

13
32
156

16
12
197

20 oz wain
6 oz oil
9-32-10

(120)
73° 9"

3-4 sec rising
1'30" washing

---

20 oz wain
8 oz oil
9-51

1 hour 175°
from 9/8/97

(156)
73° 9"

2 sec rising
50 sec washing

---

20 oz wain
6 1/2 oz oil
9-58-20

(197)
73° 9"

2 sec

---

20 oz wain
8 oz oil
10-41-40

Heated Dec 7 1 hour 325°

(10)
56° 9"

45 sec rising

Dec 9 1897

20 oz wain
8 oz oil

Heated Dec 7 1 hour 325°

(84)
75° 9"

19
6
84

---

20 oz wain
8 oz oil

1 hour 325°

(5)
74° 9"

(27)
74° 18"

---

20 oz wain
8 oz oil

from 175°

(264)
74 9"

22
10
264

---

20 oz wain
8 oz

3 hours 175°

(192)
74 9"

16
8
192

Rise in temperature

	18"	9"	50° 18"	9"
44°	228	56	384	108
	72	72		126
		14	96	28
	300	136	480	262
	150	45	240	87

150)240(1.6 .45)87(1.9
150 45
900 420

average 6)1.75 29% per degree

53° oil	9"	73°	9"
20 gr 8/20	6		66
6g	20		120
6/20g	48		197
	74		383

74)383(5.2 26% per dg
370
130

an increase of 1° increases fluidity 25%

25.5) 55 (21.6
510
400
255
1450

26) 6 (231
52
80
78
20

27.5) 75 (2 7.3
550
2000
1925
750

48) 8 (1
48
300

6) 20 (33

265) 65 (24.5
530
1200
1060
1400

27) 7 (258
54
160
135
250

28) 8 (28.6
56
240
224
160

78) 168 (2.2
156
120

168) 204 (1.2
168
360

33) 1000 (33

240
160
220
120
740
25) 185
74

Increase percentage of oil

20 oz min oil at $3				Percentage of fluidity
5 oz	=	25		
5½	=	27½	6	333
6	=	30	20	240
6½	=	32½	48	160
7	=	35	78	220
7½	=	37½	168	120
8	=	40.00	204	1073

25) 200 (8.0
25

an increase of 1% in oil increases fluidity about 75%

3° rise in temperature equals about increase of 1% or one part in oil.

[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]

Anthracite Brick Fire

10.37		
10-40:24	270°	
10-41	285	22°
10-42	310 Drum	25°
10 43	330	20°
44	345	15°
45	358	13°
46	370	12°
47	382	12°
49	400°	

11-37 stop

#2 2 Anthracite bricks

11-55	2200	
57	265	22 1/2
12	310	15
2	321	10
4	345	8
6	364	9 1/2
9	380	7
10	390	5
15	4000	

12-55 stop

#3 2 anthracite Bricks

6 oz passed through 5 mesh
1 oz fines rolled twice
Heated to drive off moisture mixed barely warm

2-15	200° held at 210°		
2-18	213		
21	252	85	13°
27	337		14°
30	367		10°
36	389	22	3
38	395		
~~39~~	~~400~~°		

3-18 Strip

Did not crack

- Briquette good

#4 2 anthracite Pocket.
same as #3

3-31	2.15	
3-33	295	40°
-35	345	25°
37	385	
39	400'	

#-16 strip

Bonquette. good

	10-12	50	m 2 up	
	10-12	-20	m 2 on car	
	13	42	H	
	14	-10	m. 1 Down	
		20	" 1 C.D.	
35		55	" 7.D	
			m 2 7.D	
	15	10	m. 1 up	
			over	
		Wait for car		
		40	m. 2 C.D	
		55	" " 7.D	15
	16	5	" up	
		45	m. 2 O.C	
	16	50	m. 1 Run	
	17	20	" " Down	
		Rope caught on pulley		
	19	45	1 C.D	
35	20	20	1 7.D	5'-25"

		No. 1		No. 2	
		No. one	S.U	10 - 19-50	
			Down	20-35	
				wait Signal	
			C.D	21-20	
			F.D	-40	20
			O.C	22 15	
			S.U	22-30	
		39-30	Down	Mill shut down	
		45 10	CD	43-30	
	40	45-50	F.D	— -50	20
		47	O.C	44-30	
			S.U	45-50	
		49-45	Down	46-25	
		50-10	C.D	Wait Signal 48-45	
5'-25"	30	50-40	F.D	Pulling up 49-15	30
		51-25	O.C	50-30	
		52-20	S.U	51-15	
		53-20	Down	51-35	
3'-5"		Wait signal 54—	CD	-50	30
	55	54-55	F.D	52.20	
			O.C	53.5	
			S.U	54-10	
		56-50	Down	54-20	
				wait	

	No. 1		No. 2
	10-57-30	C.N	10-55 20
3'-20	30 58-	F.N	40 20
		O.C	56-40
		F.W	57-35
	11-12-50	Down	58-30
	13-15	C.N	No. 3. 59-1'
	35 13-50	F.N	Elevator XI, Stopped
	14-30	O.C	11-12-25
		F.W	11-13
	16-35	Down	Train stopped 15-10
3'-35	No. 2 17-	C.N	15-40
	50 17-50	F.N	-50
	19-25	O.C	16- 10
	19-50	F.W	16-50
	20-30	Down	17-25
	-35	C.N	18-20
3'-50	20 21-55	F.N	30
	23	O.C	50 20
	23-25	F.W	19-30
	24	Down	Water cups 24
			27-5

Rafter stuck 11-26		C, D	27-30
35	26-35	7, N	-50 20
	27, 45	O, C	28-30
Dispute about ship 1-6	30-10	S, N	29, 15
	31-40	Down	29-40
		C, D	45
Wire rope -45		7, N	30 15
wind on drum		O, C	30-40
		S, N	
		Down	
35	1-9-40	C, D	1-10-40
+	10-15	7, N	10-50
		O, C	11-20 30 +
	12-5	S, N	
	12-5	Down	15-50
	15	C, D	16-00
Crane rope back 15-25		7, N	16-20 20 +
+		O, C	17-
		S. N	
		Down	

No 1.		No 2
17-45	A	19
7-55	C.D	19-5
40	7.D	20
18-35		22-25
21-0	D	Train stuck Trolley
		25-50
-5	C.D	55
35	7.D	26-20
-40		23
No. one	Down	28-40
		50
	C.D	29-7
	7.D	17
32-10	Down	31
-22	C.D	31-12
		20
-50	7.D	31 32
26		wait for train
35-10	Down	33-25
		-30
-20	C.D	-48
		18
50	36-10	7.D
38-30	Down	36-45
		-50
35	C.D	
		18
25	39-0	7.D	37-8

40-57	D	39-25	
41+8	C,D	-32	
42-5	F,D	-45	13
	D	42-52	
No One	C,D	wall 43-15	
	F,D	-38	23
	Down	45-20	
	C,D	-27	
	F,D	-50	23
	Down	Rock on car in wrong place	
	C,D	46-10	
	F,D	48-6	
		-35	27
	Down	49 57	
	C,D	50 2	
	F,D	1- ~~50~~ 20	18
	Down	52 - ~~6~~	
	C,D	- 5	
	F,D	-25	20

# 1	# 2
35	15
35	20
40	20
30	36
55	30
30	20
35	10
50	20
20	20
35	15
35	30
40	20
35	20
28	25
50	17
25	20
58	18
40	18
60	13
	23
	23
	27
	18
	20
	20
	20
	19
	15
	25

19 | 73 6 | 38
-57
166

26 / 54 / 56 / 29

584

Down-	1-5 3-55
C.D	54-
F.D	54-20
1-57-27 Down	55-45
mark signals C.D	56-25
2-3-30 F.D	-45
10 3-10	2- 3-25
5-15 Down	Signal 4-6
Big rock -25 C.D	-27
50 6-25 F.D	
8-25 Down	7- 5
-35 C.D	-15
Roller fed 16-35 F.D	-30
+ 18-15 Down	14-45
-25 C.D	W.S. 15-20
+ Mill shut down F.D	-45
Down	
C.D	
F.D	

20 +

20 +

19 +

15 +

25

No 1		No 2
	Drum	[illegible]
	C.D	-30
	F.D	-50
9-31-20	Drum	30-15
Long [illegible] 38	C.D	-25
32-50	F.D	-45
	Drum	33-20
	C.D	-28
Paper twisted	F.D	-42
36-36 5"	Drum	35. 40
57-0	C.D	
-25	F.D	-36-0
40-00	Drum	~~[illegible]~~ -37-50
10	C.D	
Blot	F.D	[illegible] 35.35
10-7-55		43
10-45	Drum	10-8-40
-55	C.D	12 58
11-48	F.D	9-12
	Drum	light scraping engine loose collar
	C.D	cracked plate on
	F.D	intermediates

27'

3-46-15	Down	3-44-25
-25	C.D	-47
-45	F.D	45-3
	Down	47-10
D.7	C.D	-40
	F.D	-57
50.10	Down	49-25
Least original 3-50 50	C.D	-30
~~Last original~~ 51 15	F.D	~~-35~~
53-15	Down	51-33
-20	C.D	52-0
-52	F.D	52-20
55-55	Down	53-20
56-5	C.D	-30
-25	F.D	-55
58-40	Down	
-50	C.D	57-10
3-59-10	F.D	-25

No 1		No 2
No one	Down	3- 59-40
	C.D	50
	F.D	4-0-10
		several o/c/pas
4-12-55	Down	4-13-50
13-0	C.D	Until signal 14-25
-30	F.D	-45
15-45	Down	17-20
16-0	C.D.	30
Big hump		45
16:55	F.D	19-10
	Down	-20
	C.D	
19-50	F.D	
21-50	Down	20-35
22-5	C.D	-40
22 25	F.D	21.25
	Down	
	C.D	
	F.D	

12/8 97. Anthracite

8 Room 0g

32 water "

40 Pitch. gram

~~[illegible] 700~~

750 to 800 @ 2.00

~~[illegible]~~ @

[illegible] 600 [illegible]

[illegible] 850 .400

Pengwitte Little